

EXHIBIT A



**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

In Re: Methyl Tertiary Butyl Ether ("MtBE")
Products Liability Litigation

MDL No. 1358
Master File C.A. No.
1:00-1898 (SAS)

This document relates to the following case:
City of New York v. Amerada Hess Corp., et al.,
04 Civ. 3417

EXPERT REPORT OF KATHLEEN M. BURNS, Ph.D.

**Methyl Tertiary Butyl Ether in Drinking Water
and Public Health Protection**

168 Burlington St.
Lexington, Massachusetts 02420

Kathleen M. Burns Ph.D.

Signature

February 6, 2009

Date

II. Opinions

I have been retained by counsel to review the available information on MTBE and to provide an opinion as to the potential health effects, if any, of MTBE. I have also been asked to provide an opinion on the nature, timing, and communication of health-related information by industry¹, industry and government's public actions regarding MTBE contamination of drinking water in the United States, and on the actions of water providers in response to MTBE contamination.

In formulating my opinions and preparing this report, I have relied upon the following:

- My experience and training in the fields of public health, public policy, toxicology, epidemiology,, biology, risk assessment and hazard evaluation, and product stewardship.
- The scientific studies, government reports, and other documents listed in the attached bibliography.

My opinions are as follows:

Based on substantial scientific evidence, MTBE in drinking water is likely to pose health hazards² to some members of the public. MTBE caused cancer in animal models that are relied upon by the US government to predict cancer in humans. MTBE damages genetic material and caused other serious health problems in multiple species that the US government relies upon to evaluate the potential for birth defects and other types of damage. There is no credible or proven "safe" level of MTBE exposure and there is substantial evidence that no safe level exists.

Before MTBE was introduced as a gasoline additive in 1979, industry was aware of MTBE's potential for causing serious health effects by virtue of the large body of medical knowledge available on ethers and from their own early studies. Industry knew by 1980 that MTBE posed health hazards and could contaminate water, based on the scientific information they had and their own experience in the field. Additional evidence regarding MTBE's potential for serious health damage and widespread contamination was available prior to industry's selection of MTBE as a fuel oxygenate to meet RFG requirements in the early 1990s.

Industry failed to act as good product stewards by (1) delaying or failing to perform additional experimental studies when the evidence indicated that MTBE demonstrated the potential to

1. For purposes of this report, in order to simplify statements, "industry" is used herein to specify members of the petroleum industry who manufactured and blended MTBE named as defendants in this case.

2. The term "hazard" is used broadly in this report to refer to all types of physical harm, including birth defects, developmental abnormalities, cancer, and damage to organ systems and basic physiological functions in the body. I have chosen to use the concept of hazard because it is a well founded idea that has been used in public health evaluations and protective public health policies for many years across many parts of the globe.

cause health hazards; (2) failing to communicate this potential for harm to regulators or the public in a timely manner; and (3) skewing and/or misrepresenting the evidence of the potential for health damage in order to perpetuate the use of MTBE.

Industry was not a good product steward because they elected to continue and increase the use of MTBE in gasoline in the 1990s in spite of growing evidence of health hazards and foreseeable extensive contamination of water.

Drinking water standards for MTBE are developed through deliberations where public health is traded against other considerations. The standards vary considerably, affording varying levels of protection and it is my opinion that they do not comprehensively protect the public from harm.

The seriousness of the health hazards posed by MTBE requires the maximum protection from exposure that is possible. It is my opinion that water providers are acting in a responsible and reasonable manner in seeking to minimize public exposure to MTBE.

III. MTBE Health Hazards

A. Background

"Dwell on the fact that MTBE will give widespread and multi-generation exposure. Also indicate that there will be multiple types of exposure."

S. Ridlon, ARCO Chemical, February 1980 American Petroleum Institute MTBE meeting minutes

The statement of Dr. Ridlon at a meeting convened by the American Petroleum Institute for representatives from Exxon, ARCO, Texaco, Tenneco, and Shell demonstrates that concerns regarding MTBE in 1980. Industry's knowledge in 1980 regarding widespread public exposure has been borne out in fact. In January 2007, the United States Centers for Disease Control released study results showing MTBE in 98.6% of the people they tested. MTBE contamination of the US population is now essentially universal.

In this report I explain why we should care if MTBE is in drinking water or in our bodies. Section III summarizes key health hazard evidence and when they industry learned of the hazards, usually through their own studies. I summarize evidence on communication of the health hazard information from industry to the public. This report clarifies that industry had extensive early knowledge that put them on notice regarding MTBE hazards before it was extensively commercialized, that they did not pursue essential information in a timely manner to fully understand the harm MTBE could cause, and that they misrepresented information that could have alerted the public³ to that harm.

Sections IV, V, and VI rely on the health evidence to address industry's stewardship of MTBE, the inadequacy of MTBE drinking water standards, and the need for water providers to protect the public from exposure to MTBE, to the degree possible. It is my opinion that industry's actions directly resulted in the current avoidable widespread contamination, and actions are required to protect the public, to the degree possible, from exposure to this hazardous chemical.

Some toxicological studies⁴ of MTBE were carried out by industry in the 1960s and 70s, prior to the introduction of MTBE as an octane enhancer. These studies found a number of abnormal

3. For purposes of my opinions, "the public" includes the general population, their representatives, agencies charged with protecting them (e.g., USEPA), and the scientific community in so far as technical information provided in journals is open for public scrutiny and review.

4. Toxicological studies evaluate whether harm is caused by a chemical and the nature of the harm. The evaluation of a chemical's harmful (aka toxic) properties includes exposing study subjects to the chemical, observing the effects, usually with a comparison group who are not exposed (controls). Scientists look for external and internal damage, abnormal growth and development, a shortening of lifespan, abnormal performance of basic body systems, changes in behavior and nervous system function, and harm to subsequent generations. A study often focuses on one aspect of harm (e.g., to the developing fetus) and they may be carried out at different exposure levels and with exposure from different sources (e.g., air, water, food). They are done over different lengths of time and at different ages. Numerous studies are necessary to fully understand the types of harm a chemical may cause under different exposure conditions and during different phases of life. For ethical reasons testing is typically done on animals instead of humans, with species selected who have been shown to respond similarly to humans with respect to the types of damage being studied.

results following short term (e.g., two week) exposures to MTBE. As early as 1969, Sun Oil was advised by the company conducting MTBE testing that:

"These studies give a good indication of the effects and hazard from a single exposure. However, they do not give adequate information to evaluate the hazard from repeated and/or prolonged exposure, particularly to the vapors."

(Letter from the President of Industrial Bio-test Laboratories to Dr. Shang of Sun Oil Company, March 27, 1969, SUN-108-485)

In 1979, MTBE was introduced as an octane enhancer, with insufficient information to insure public or worker safety, and many studies in hand that indicated a potential to cause harm. Industry sponsored limited studies prior to 1980, but did not undertake studies that would identify health damage that could result from prolonged exposures. The studies that were carried out in the 1980s continued to identify serious problems, including MTBE's potential to cause abnormal nervous system function and cause birth defects and reproductive system damage.

Industry documents contain discussions of their statements that contamination would occur, and that they needed to determine the potential hazards of long-term exposures. They also recognized that long-term (i.e., lifetime) studies were necessary to meet their public responsibilities and to satisfy federal testing requirements. Long-term studies were critical because they mimic the long-term exposure of the public that occurs over many years when MTBE enters air or water. In spite of the foreseeable contamination, and despite having been put on notice regarding the potential for serious harm, long-term studies were not carried out until the late 1980s, when USEPA issued a consent decree requiring such studies.

The long-term studies demonstrated MTBE's ability to damage most organ systems at exposure levels lower than those studied in the short term studies and identified numerous types of cancers in the study subjects. Additional health hazards have been identified in recent years, including abnormal hormone function and immune system responses. Taken as a whole, studies of MTBE form a body of scientific evidence that demonstrates MTBE is a health hazard. The evidence indicates that there is no safe level of exposure to MTBE. Therefore, prudent and protective actions are necessary to ensure that public exposures to MTBE are eliminated, or minimized to the greatest extent possible.

Toxicological studies of MTBE were sponsored almost exclusively by industry before the widespread use of MTBE and resulting water contamination occurred. The study results put industry on notice that MTBE was a health hazard and that public exposure was likely if MTBE was added to gasoline. The information obtained from the studies was not comprehensively communicated to regulators or the public, limiting the ability of agencies charged with protecting the public health from doing their jobs.

This section provides health hazard information on the following topics:

- Basic testing
- Nervous system damage

reproductive function.

Billitti also found that two metabolites of MTBE, TBA and TBF (tributyl formate) increased testis weight. As with the results above, this study provides evidence that MTBE can cause abnormal changes in the male reproductive system. The findings above are consistent with the results of studies from the early 1980s that showed MTBE had a potential to harm reproductive function. If the earlier studies had been taken seriously and the problems had been investigated fully, it is highly likely that widespread MTBE use and contamination would not have occurred.

Quality Control

Dr. Kirwin, was an industry toxicologist in charge of health and safety review of MTBE and participated in API and other industry meetings on MTBE's health effects. He made observations about many of the problems regarding the reproductive and developmental toxicity studies that were sponsored by the Defendants. He noted an inconsistency when the quality control auditor reported that the study laboratory erred in reporting no adverse effects, when there were in fact effects from MTBE (page 237 May 31, 2007 Kirwin Deposition). Dr. Kirwin identified the loss of animals as "a significant error" because it could result in a miscalculation of how many animals died (age 238, *ibid*). He also noted that not being able to determine which litters had missing pups or the number that were missing, or whether they were missing because they had abnormalities were "important quality control assurance concerns" (page 241 *ibid*).

Dr. Kirwin stated that that some of the problems identified in the internal quality control reviews would not have been sent to the reviewers within the government (page 243 *ibid*). In discussing peer review, he stated, "they (the reviewers) get the paper that is intended to be published." (page 303 *ibid*, reiterated page 25, June 2, 2007). In other words, the reviewers of a prospective journal article do not get information such as quality control reports on study problems, lost animals, misidentified animals or other reports that can call into question the accuracy of a study, unless the study authors chose to report those problems within a paper.

In fact, most of the numerous problems in the reproductive and developmental toxicity studies that were identified by quality control reviews and reported internally to the Defendants were not discussed in the papers that were published by the Defendants' scientists (e.g., Biles, Conway). Clearly, publication does not guarantee adequacy of the studies or accuracy in results. The scientists submitting the papers are relied upon to be accurately reporting their observations, and any problems that occurred during the studies.

The very serious nature of the problems that were observable in the Defendant's studies in spite of the limitations in the study is a very important issue when considering the developmental hazards of MTBE. Yet these studies were repeatedly referred to by the Defendants as showing that MTBE did not cause any particular hazards to pregnant women or children. In the absence of full information on the studies, having only the very limited information in the journal articles, this erroneous information was perpetuated and has misled the public regarding the true nature of the studies.

The reality of the situation did not suit the needs of the Defendants and so was not disclosed in

the journal articles that were published. The very serious results obtained in the developmental and reproductive toxicity studies, ranging from bone formation defects up to death, were not addressed adequately. Dr. Kirwin sums up his groups' efforts regarding MTBE in response to a question about whether he was asked to reevaluate MTBE:

"I don't know that I was asked to reevaluate it. We just continuously, through the early '80s were working with trade associations to develop toxicology testing programs so we could confirm the health safety of the chemical."

(Kirwin, page 71 May 31, 2007 deposition)

In fact, they did not take seriously the information coming out in the developmental, reproductive, or other studies when electing to commercialize MTBE. What they did do was confirm their earlier assertions of safety. This did not serve the public well.

Dr. Kirwin was involved in the design of the studies, including a determination of how many animals would be used (page 156, May 31, 2007 Kirwin Deposition). However, when the issue of USEPA animal testing guidelines was brought up in his deposition (e.g., how many study subjects should be used to insure that a study can achieve statistically significant results), Dr. Kirwin was not aware that there were specific protocols. The fact that many of the study outcomes appear serious but do not achieve statistical significance is not surprising in light of Dr. Kirwin's statement.

As noted above, there are many federal policies designed to protect children, who are considered more vulnerable to chemical exposures in general. The position of industry with respect to children and MTBE may be better understood in the words of one of their own scientists who directed health-focused research in the 1980s. Speaking to the issue of protecting the public, taking into consideration effects on the general public versus workers, Dr. Kirwin stated: "There's no difference. No difference at all." (Kirwin, page 129, May 31, 2007 deposition). Obviously, the majority of those who work in the field of children's health, and many who work in the field of adult health would not agree that a fully-grown, healthy adult worker is identical to the varied members of the general public.

Neurotoxicity and Development.

A significant gap in the developmental toxicity data that has never been addressed is the area of nervous system damage during development. Based on the considerable information available in pediatric neurotoxicology (harm to the nervous systems of children), Dietrich et al (2005) stated that:

"The developing human central nervous system is the target organ most vulnerable to environmental chemicals."

The desire to protect children from neurotoxic chemicals is both well-founded and reasonable. The lack of research into neurological damage by MTBE, given its well-established neurotoxic capabilities, is reason for considerable concern, especially in light of widespread population exposures. Concerns regarding increased rates of neurological diseases in children have raised

IV. Product Stewardship

A. Background

This section discusses the product stewardship of MTBE by industry, specifically focusing on the health-related information that was available, its communication, and the subsequent management of MTBE hazards by industry. Product stewardship is a long-established idea, though terminologies have varied over the years. For purposes of this report, a definition offered by the Kodak Corporation succinctly sums up the basic premise:

Product Stewardship is an integrated business process for identifying, managing and minimizing the health, safety and environmental risks throughout all stages of a product's life in the best interest of society and our key stakeholders; customers, employees and shareholders.
(Kodak, 2007).

Industry is familiar with this concept. BP's website provided one example in their description:

Specific responsibilities that we assume as product stewards include:

- Assessing health, safety and environmental impacts of new products before they are commercialized
- Reassessing existing products regularly to ensure their continued safe handling and use
- Assessing the health, safety and environmental impacts of existing products in new uses or new markets
- distributing Material Safety Data Sheets and other information to ensure the safe handling and transport of products

<http://www.bp.com/sectiongenericarticle.do?categoryId=9011268&contentId=7006832>).

As another example, Chevron claimed it:

seeks to manage the environmental, health and safe impact of our products throughout their life cycle. This concept is known as "product stewardship" and is formally integrated into OEMS. As part of OEMS, business units are required to implement processes and systems to identify, minimize, manage and communicate potential risks throughout the product life cycle.

http://www.chevron.com/cr_report/2004/environmental/product_stewardship.asp)

As a final example:

ExxonMobil applies a rigorous and consistent approach to identify and evaluate risks associated with new and modified products and their manufacture, use, and disposal. Similarly, ExxonMobil is continuously adapting new technologies to improve product performance. In order to ensure minimal effects on both people and the environment, we regularly use new, scientific information in the production of our additives, which are used for industrial diesel engines, lubricants, and metalworking.

ExxonMobil tests and monitors product safety and health factors. We communicate results characterizing any risks and specify proper management processes to customers, third parties, and the public.

(http://www.exxonmobil.com/corporate/citizenship/ccr5/product_stewardship.asp)

USEPA has addressed product stewardship through various publications and states the following:

In most cases, manufacturers have the greatest ability, and therefore the greatest responsibility to reduce the environmental impacts of their products.

(USEPA, 2007).

Product stewardship is also often placed in the context of overall social responsibility and corporate responsibility, indicating that there is a need for the private sector to consider their actions in the context of broader social needs and well-being.

The information presented in this section makes clear that industry did not act in a way that was protective of public health. Industry knew that MTBE posed health hazards and encouraged MTBE's use in gasoline in spite of that knowledge. Although they were on notice with information that made subsequent water contamination and health hazard problems foreseeable, they did not act responsibly in product testing, communications of test results, or their actions to affect public policy. Industry crippled the public's ability to obtain protections through their government agencies and this resulted in the current health, safety, and environmental risks.

By the time industry was poised to greatly increase MTBE use in the early 1990s, industry was aware, at a bare minimum, that it was an animal carcinogen and had many other dangerous properties. Building on that information, key examples of industry's failure to be good product stewards with respect to MTBE discussed in this section include the following:

- Public exposure to MTBE was anticipated by industry at the time it was first added to gasoline. When industry chose to greatly increase MTBE use in the 1990s, this widespread exposure became inevitable. It was also preventable.
- Industry delayed carrying out and communicating results of key studies, leading to a delay in public awareness of MTBE's hazards until after substantial contamination had occurred.

- Industry's communications regarding MTBE hazards were misleading and inappropriately dismissive, especially regarding cancer and the effects on reproduction and development. It did not communicate the spectrum and severity of harm that MTBE caused in toxicological studies.
- Continued actions during the 1980s and 1990s to obscure MTBE's hazards allowed industry to continue its use and expand it greatly during the 1990s. Actions by industry resulted in a lack of awareness of the actual hazards and a corresponding lack of appropriate government hazard management policies.
- Industry was neither a good product steward nor behaving in a socially responsible manner when they elected to add MTBE to gasoline and greatly increase its use. Industry did not act with sufficient responsible care to prevent public exposure.

B. Public Exposure to MTBE: Inevitable and Anticipated

A review of only a few industry documents establishes that industry was keenly aware that the public was going to be exposed to MTBE via drinking water. Indeed, those involved in the early toxicological testing specifically discussed the need to conduct studies which adequately assess the impact of exposure via drinking water. It is clear that both the experience of MTBE producers in the 1970s with water contamination and subsequent knowledge garnered regarding MTBE clarified that its potential for water contamination was very high. For example, an early spill in Old Bridge New Jersey resulted in a difficult and costly cleanup, as reported in 1981:

A contamination abatement system installed at this aquifer, including 7 extraction wells and a water treatment facility, reduced the (MTBE) concentration by an estimated 25%.

(Althoff et al, 1981).

As another example, on March 31, 1981, Dr. Randy Roth wrote a memo indicating Ben Thomas of Shell sent a message to an MTBE study group he attended, stating:

Shell has been involved in the contamination of a township's drinking water with DIPE (disopropyl ether) and 100 ppb MTBE. According to Ben [Thomas], approximately 20% of all underground storage tanks leak, leading to the possibility of groundwater contamination. This groundwater contamination may have to be considered when long term testing is considered.

(Roth, 1981).

Industry, or at least those members of this MTBE study group, learned of the extreme difficulties in controlling and remediating MTBE once it reached groundwater from early spills. This knowledge was known or knowable by the industry generally.

In discussing the need for health studies, requirements of USEPA, and how the management of

various companies might be approached, industry noted in multiple statements that human exposures were likely. In 1979, J. Moon, in a letter on behalf of Phillips stated that: "...potential exposures of the public to fuel containing MTBE is large and uncontrolled(Moon, 1979).

In response to the clear knowledge that MTBE would cause widespread contamination (please see Ridlon quote at the beginning of page 6), industry scientists were aware that MTBE exposure would occur through many avenues, and even impact people within their homes. They knew important questions must be answered:

1. Is the water "safe" to drink?... to bathe in?... to wash fruit and vegetables?... to cook with?... to water pets and livestock?...to irrigate crops?...to water the lawn?
2. Will the organoleptic (odor and taste) properties of the contaminants provide an adequate warning that contamination of groundwater has occurred?
3. Are the organoleptic properties of contaminated water such that people would refuse to drink it?

(Ben Thomas, September 17, 1984 ARC0176060)

With the extensive concerns regarding MTBE contamination growing over the years, many states moved to ban MTBE on a statewide basis. In 2004, USEPA reported that the following states had full or partial bans in place: Iowa, Minnesota, Nebraska, South Dakota, Colorado, California, Michigan, Connecticut, New York, Washington, Kansas, Illinois, Wisconsin, Ohio, Missouri, Kentucky, Maine, New Hampshire, and Indiana. In spite of the difficulty that states faced in developing and enacting product bans in their states in order to protect their drinking water, The Oxygenated Fuels Association (OFA) challenged those bans in two very high use states (as of 2004): New York and California. The courts upheld the rights of both states to ban MTBE (USEPA, 2004).

In conclusion:

- Industry was aware of the potential for drinking water contamination prior to development of production facilities in the 1980s, and prior to ramping up for widespread use in gasoline in the early 1990s.
- Industry (OFA) even fought a ban on MTBE after state governments obtained enough information about its dangers that they took the extreme measure of banning it with their states.

physiology. Scientists rely on those species of animals that have been studied for a long time, have been bred to be relatively free of spontaneous diseases at young ages, and are known to be good predictors of human responses for certain types of disease, or in response to certain categories of chemicals. Industry could have done long-term exposure (e.g., two-year lifetime) studies prior to introducing MTBE to gasoline, in order to determine the spectrum of harm it could cause. They also could have done reproductive and developmental damage studies prior to MTBE's use, but elected not to do so. Although industry discussed in the very early 1980s the need to do long term testing, they ultimately decided not to do these studies. It was not until the EPA required chronic and cancer studies in the late 1980s that such studies were performed. In fact, industry resisted having to perform these studies.

In 1986 industry was notified of EPA's intent to require testing, and that set in motion a series of efforts to avoid the testing. As an example, Exxon wrote to EPA in late 1986 stating that:

Exxon feels that there is sufficient health effects data on MTBE and that a proposed chronic inhalation study, while providing some additional information on MTBE, appears unjustified considering the biological properties of MTBE and SAR aspects.

(Lington, 1986).

Mr. Lington's attached summary of responses to EPA's testing recommendations included information stating that MTBE did not cause adverse effects on reproduction or birth defects, even at high concentrations, and that "the prevailing data on MTBE do not support the need for a chronic study."

In 1987, the MTBE Committee, an industry group, met and "possible strategies were outlined for dealing with EPA." The consensus of the Technical Subcommittee included:

- the societal impact of imposing test rules that require extensive, long-term toxicity testing will be great, possibly so great and so expensive that it would be brought to the attention of the Office of Management and Budget, as required by law;
- mainly for political reasons, some form of toxicity testing will be required.

(MTBE Committee Meeting, February 16, 1987; BPA00365608).

The February 27, 1987 submission to EPA by the MTBE Committee represented:

there is no evidence that MTBE poses any significant risk of harm to health or the environment, that human exposure to MTBE and release of MTBE to the environment is negligible, that sufficient data exists to reasonably determine or predict that manufacturer, processing, distribution, use and disposal of MTBE will not have an adverse effect on health or the environment, and that testing is therefore not needed to develop such data. Furthermore, issuance of a test rule requiring long term chronic testing will have a significant adverse environmental impact.

(MTBE Committee Statement, February. 27, 1987).

Shortly thereafter, Sun summarized their concerns in an internal memo, describing both collaborative efforts discussed at an early March meeting with MTBE Committee members, and Sun's own interests. It states that:

Conclusions given to EPA were that sufficient evidence is available to reasonably determine that MTBE poses negligible risk to human health and the environment, and further testing is therefore unnecessary.

(Sun, 1987).

In the mid-1980s, in spite of their arguments that no additional tests were needed, the USEPA determined that chronic toxicity testing - including studies of MTBE's ability to cause cancer - were required. In subsequent years, industry was forced to carry out toxicity testing, after consent order was issued March 31, 1988. This was done so that the USEPA and others charged with protecting public health had sufficient information on which to base protective decisions regarding the use, distribution, exposure, standards, and other aspects of MTBE.

Industry's Performance Under the Consent Order.

The industry-sponsored cancer studies, which they resisted performing, had many problems. There were serious design flaws. Both rodent studies had so many premature deaths in some exposure groups that the animals in those groups were terminated far ahead of schedule. In one study group, 41 out of 50 subjects were dead by 18-months of age (Bird, et al. 1997). The early termination meant that effects that might have been evidenced during the latter part of life, when most cancers occur, were not possible to observe. The actual results that would have been obtained cannot be determined, and industry did not repeat these studies.

Usually studies are planned by carefully reviewing the information from past studies on what levels of exposure will be well-tolerated to keep the animals alive for their normal lifespan. Exposure should not be so high that it kills the majority of animals prematurely because that does not allow us to see the spectrum of cancers or other problems that could result from a lifetime of exposure. Industry did not conform to these protocols when conducting the studies.

In 1992, industry disclosed the results of their studies to EPA and reported statistically significant increases in multiple types of cancer and in multiple species of animals (both important in designating a chemical as a carcinogen). The statistically significant results were obtained in spite of the early loss of so many animals. Industry quickly undertook a number of new studies that were designed to show that the results of the cancer studies were irrelevant and should not be relied up on in a determination of the status of MTBE as a carcinogen. This is another example of the pattern and practice of industry in attempting to downplay the risks posed by MTBE.

Non-Industry and Publicly Available Studies.

In 1995, Belpoggi et al reported the results of their study on the results of oral exposure to MTBE (akin to drinking water exposure). This study was conducted in Italy and was unrelated to the Consent Order. They found multiple types of cancer, as previously noted, including leukemia,

In conclusion:

- Industry had early knowledge of the potential for harm and was on notice that additional tests of MTBE were necessary to fully understand its hazards. Industry chose to delay carrying out the tests, in spite of early recognition of the need to do such studies.
- Industry's delays in testing and thus the lack of information on the hazards made it possible for MTBE to be used in gasoline, thereby placing the public at risk of contamination and harm. If industry had carried out essential tests prior to its use and if industry had communicated results comprehensively, it is unlikely it would have been permitted to be used in gasoline.
- Industry's actions show extremely poor product stewardship and corporate responsibility in that they placed the public in harm's way and widely contaminated both the environment and the people who inhabit it.

D. Misleading Communications

In Section III, I provided detailed information on one category of harm that was badly communicated - MTBE's effects on development. I described what was said in summary reports in comparison to what was actually observed. I also presented a brief overview of information on toxicity in general and on the results of cancer research, again indicating that results were dismissed as not relevant using criteria that are not generally accepted in the scientific or regulatory community.

The information that industry provided to the public on MTBE was misleading and would not generate a level of concern as high as would have resulted from a comprehensive disclosure of their studies' results. Industry sought to undermine and dismiss study results that indicated MTBE was hazardous, which caused unnecessary confusion and delays in managing and regulating MTBE.

A major goal of industry appears to have been to ensure acceptance of MTBE by the public and by regulators. Presaging many statements and study interpretations that would follow, in 1980, Conaway, a toxicologist at Texaco stated, "one important rationale for the (testing) program would be to lay-to-rest public fear should it develop." (MTBE Meeting Minutes, February 5, 1980).

Developmental and Reproductive Toxicity

Conaway's subsequent summary of reproductive effects that were discussed in Section III (Conaway, 1985) did not fully characterize the potential for harm indicated by his study results. One could characterize his summary of the birth defects and mortality caused by MTBE as laying-to-rest fears. His initial summary was communicated over and over again by industry as time went on. In summarizing the existing information on MTBE in 1983, Hoover/API's summary reported no reason for concern (Hoover/API, 1983c) and has been repeated many times since

following short exposure periods. The lack of long term studies of this is regrettable, and only augments concerns. The only prudent and reasonable course of action for water suppliers to take under these circumstances is to eliminate to the degree possible this chemical from their drinking water supplies.

The city must prepare for weather conditions and other factors over which they do not have control in planning for future water needs. They are looking to historic water sources within the city limits to address those needs, and these sources have been contaminated by MTBE due to irresponsible actions on the part of the industry that produced this chemical. The ultimate responsibility for that contamination lies with those who produced and distributed MTBE. When New York City seeks to eliminate MTBE from their water supplies and prevent public consumption of water contaminated with MTBE, they are addressing their obligation to provide safe clean drinking water.

Based on the information above, it is my conclusion that the City of New York is making a responsible and reasonable choice when they seek to minimize the exposure of the public to MTBE to the best of their ability.